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Bibliography

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[FI]

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Epitome

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(57) [Abstract]
[Technical problem] Surge voltage is reduced while aiming at reduction of the number of erectors.
[Means for Solution] On one heat sink H, six insulated-gate bipolar mold transistors IGBTU, IGBTV, and IGBTW, IGBTX, IGBTY, and IGBTZ are carried. Moreover, they are Conductors DUE, DVE, DWE, DXC, DYC, DZC, and DC and DE so that it may become a three phase bridge circuit. It connects. moreover, the conductor of an unusual appearance — laminating arrangement of said conductor is carried out by infixing an electric insulating plate in between and securing an insulation. Thus, the constituted power conversion section 10 is employable as the rectification section and the inverse transformation section of inverter equipment.

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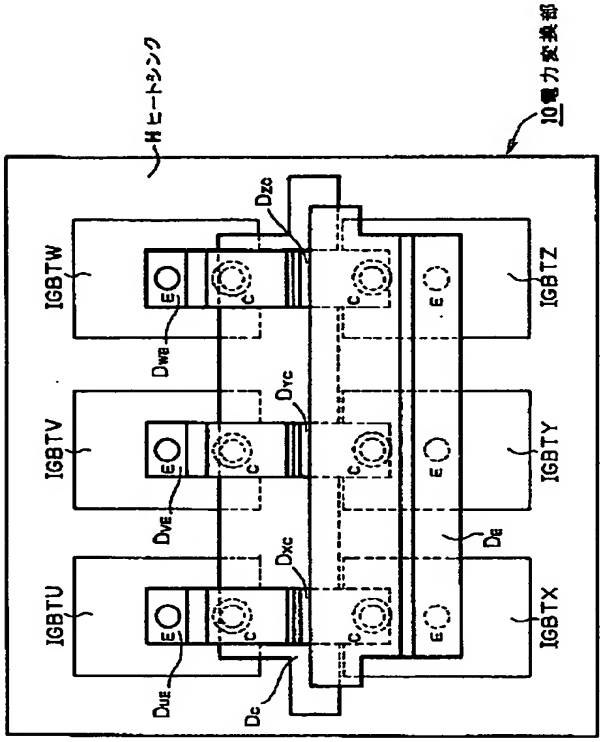

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CLAIMS

[Claim(s)]
[Claim 1] while carrying said six solid-state-switching components on one heat sink in the power inverter circuit which connects between the terminals of each solid-state-switching component with a conductor, and becomes so that it may have six solid-state-switching components and may become a three phase bridge circuit — the conductor of an unusual appearance — the power inverter circuit characterized by having infixed the insulating material in between, having carried out laminating arrangement and constituting a conductor.
[Claim 2] Inverter equipment characterized by having two power inverter circuits of claim 1, operating one side

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as the rectification section, and [redacted]rating another side as the inverse trans[redacted]ation section.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] About a power inverter circuit and inverter equipment, this invention devises reduction and the number of erectors of components mark so that it can decrease.
[0002]
[Description of the Prior Art] Inverter equipment is constituted considering the rectification section (rectification circuit) and the inverse transformation section (inverse transformation circuit) as a primary member. The rectification section and the inverse transformation section are formed combining the solid-state-switching component. Recently, it is IGBT (insurated gate bipolar trasistor : insulated-gate bipolar mold transistor) as the above-mentioned solid-state-switching component. It is adopted.
[0003] Here, the circuitry of the main circuit of the inverter equipment which adopted IGBT as a solid-state-switching component is explained with reference to drawing 4 . As shown in this drawing, this inverter equipment is constituted considering the rectification section 1, the inverse transformation section 2, and electrolytic capacitor C as a primary member. The rectification section 1 carries out three phase bridge connection of six insulated-gate bipolar mold transistor IGBTU-1, IGBTX-1, IGBTV-1, IGBTY-1, IGBTW-1, and IGBTZ-1, and is constituted. Moreover, the inverse transformation section 2 carries out three phase bridge connection of insulated-gate bipolar mold transistor IGBTU-2, IGBTX-2, IGBTV-2, IGBTY-2, IGBTW-2, and IGBTZ-2, and is constituted.
[0004] The rectification section 1 changes into direct current power the three-phase-alternating-current power of commercial frequency inputted from input terminals R, S, and T, and the inverse transformation section 2 changes into the three-phase-alternating-current power of a request frequency the direct current power changed into direct current power by the rectification section 1, and outputs it from output terminals U, V, and W.
[0005] Next, the mechanical configuration of the conventional inverter equipment which adopted IGBT as a solid-state-switching component is explained with reference to drawing 5 . As shown in this drawing, in the rectification section 1, two insulated-gate bipolar mold transistor IGBTU-1 and IGBTX-1 are carried on a heat sink H11, two insulated-gate bipolar mold transistor IGBTV-1 and IGBTY-1 are carried on a heat sink H12, and two insulated-gate bipolar mold transistor IGBTW-1 and IGBTZ-1 are carried on a heat sink H13. Moreover, in the inverse transformation section 2, two insulated-gate bipolar mold transistor IGBTU-2 and IGBTX-2 are carried on a heat sink H21, two insulated-gate bipolar mold transistor IGBTV-2 and IGBTY-2 are carried on a heat sink H22, and two insulated-gate bipolar mold transistor IGBTW-2 and IGBTZ-2 are carried on a heat sink H23. in addition -- drawing 5 -- the conductor for an input -- the conductor for DIN and an output -- DOUT It is shown and other conductors are carrying out the illustration abbreviation.
[0006] On these specifications, the combination per heat sink is called a "module." Here, one module of conventional inverter equipment is explained to a detail based on drawing 6 and drawing 7 . As shown in both drawings, on the heat sink H11, two insulated-gate bipolar mold transistor IGBTU-1 and IGBTX-1 are carried. And the collector terminal C of IGBTU-1 and the emitter terminal E of IGBTX-1 are connected by the conductor D1. Moreover, the emitter terminal E of IGBTU-1 and the collector terminal C of IGBTX-1 are connected by the conductor D2. Furthermore, the electric insulating plate 3 was made to intervene between a conductor D1 and a conductor D2, and the insulation between conductors D [D1 and] 2 is secured.
[0007] About other modules (each module of the rectification section 1, and each module of the inverse

transformation section 2), it has same composition as drawing 6 and drawing 7 .
[0008]
[Problem(s) to be Solved by the Invention] By the way, in the above-mentioned conventional inverter equipment, six modules are required for three modules and the inverse transformation section 2 in the rectification section 1 by three modules, i.e., the sum total. For this reason, while components prices, such as a heat sink, increase, there is a problem that the number of erectors increases.
[0009] Moreover, since the rectification section 1 and the inverse transformation section 2 were divided into three modules, respectively, there was also a problem that the distance of an inter module became long and surge voltage became high.
[0010] This invention aims to let assembly offer easy good power inverter circuit and inverter equipment of electrical characteristics in view of the above-mentioned conventional technique.
[0011]
[Means for Solving the Problem] while carrying said six solid-state-switching components on one heat sink in the power inverter circuit which connects between the terminals of each solid-state-switching component with a conductor, and becomes so that the configuration of the power inverter circuit concerning this invention which solves the above-mentioned technical problem may be equipped with six solid-state-switching components and it may become a three phase bridge circuit — the conductor of an unusual appearance — it is characterized by having infixed the insulating material in between and carrying out laminating arrangement of the conductor.
[0012] Moreover, the configuration of the inverter equipment concerning this invention is characterized by having two power inverter circuits of the above-mentioned configuration, operating one side as the rectification section, and operating another side as the inverse transformation section.
[0013]
[Embodiment of the Invention] Below, the gestalt of operation of this invention is explained at a detail based on a drawing.
[0014] The top view and drawing 2 which show the power conversion section (power inverter circuit) 10 which drawing 1 requires for the gestalt of operation of this invention are the side elevation. This power conversion section 10 is applicable to the rectification section and the inverse transformation section of inverter equipment so that it may mention later.
[0015] As shown in drawing 1 and drawing 2 , in the power conversion section 10 concerning the gestalt of this operation, six insulated-gate bipolar mold transistors IGBTU, IGBTX, and IGBTV, IGBTY, IGBTW, and IGBTZ are carried on one heat sink H. Moreover, these IGBTU(s), IGBTX, IGBTV, IGBTY, IGBTW, and IGBTZ are equipped with the collector terminal C, the emitter terminal E, and the base terminal (illustration abbreviation), respectively.
[0016] And Conductors DUE, DVE, and DWE are connected to the emitter terminal E of IGBTU, IGBTV, and IGBTW, respectively. Moreover, Conductors DXC, DYC, and DZC are connected to the collector terminal C of IGBTX, IGBTY, and IGBTZ, respectively. And Conductor DUE and Conductor DXC are connected, Conductor DVE and Conductor DYC are connected, and Conductor DWE and Conductor DZC are connected. They are the emitter terminal E, IGBTX, and IGBTY of IGBTU, IGBTV, and IGBTW, and R of IGBTZ in this way. The collector terminal C is connected according to the individual.
[0017] moreover, the collector terminal C of IGBTU, IGBTV, and IGBTW — a conductor — DC It connects and both these collector terminal C is connected. moreover, the emitter terminal E of IGBTX, IGBTY, and IGBTZ — a conductor — DE It connects and both these emitter terminal E is connected.
[0018] it mentioned above — as — Conductors DUE, DVE, and DWE, Conductors DXC, DYC, and DZC, and a conductor — DC and a conductor — DE The three phase bridge circuit is constituted by connecting.
[0019] and the conductors DUE, DVE, and DWE which are unusual appearances and a conductor — DC the conductors DXC, DYC, and DZC which an electric insulating plate Z1 is infixed in between, and are unusual appearances, and a conductor — DE In between, the electric insulating plate Z2 is infixed. since [thus,] the insulation is secured — the tabular conductors DUE, DVE, and DWE, Conductors DXC, DYC, and DZC, and a conductor — DC and a conductor — DE Laminating arrangement can be carried out and it can constitute.
[0020] Thus, since the one power conversion section 10 can be used as one module, while being able to perform reduction of components mark, and reduction of a components price, the number of erectors decreases. furthermore, the conductor of an unusual appearance — since it is arranged through an electric insulating plate in between, it can aim at control of surge voltage.
[0021] Drawing 3 shows the inverter equipment 20 concerning the gestalt of operation of this invention. With this inverter equipment 20, it has the rectification section 21 and the inverse transformation section 22. The rectification section 21 and the inverse transformation section 22 have the same composition as the power

'conversion section 10 shown in drawing 1 , it serves as one module in the rectification section 21, and they serve as one module in the inverse transformation section 22, and have composition of inverter equipment 20 using the power conversion section of two modules as a whole. In addition, in drawing 2 , the conductor and electrolytic capacitor for I/O are carrying out the illustration abbreviation.

[0022] With the inverter equipment 20 of drawing 3 , since it can constitute from the two power conversion sections, i.e., two modules, components mark, a components price, and the number of erectors are reducible. Moreover, since inter module distance, i.e., the distance of the rectification section 21 and the inverse transformation section 22, can be shortened, while being able to reduce surge voltage, capacity of an electrolytic capacitor can be made small. furthermore, the conductor of an unusual appearance — since it is arranged through an electric insulating plate in between, it can aim at control of surge voltage.

[0023] In addition, although the gestalt of the above-mentioned implementation showed the example which used the insulated-gate bipolar mold transistor as a solid-state-switching component, it cannot be overemphasized that this invention is applicable also to other power inverter circuits (power conversion section) using a solid-state-switching component and inverter equipment.

[0024]

[Effect of the Invention] As concretely explained with the gestalt of operation above, in this invention In the power inverter circuit which connects between the terminals of each solid-state-switching component with a conductor, and becomes so that it may have six solid-state-switching components and may become a three phase bridge circuit while carrying said six solid-state-switching components on one heat sink — the conductor of an unusual appearance — since it considered as the configuration which infixes an insulating material in between and carries out laminating arrangement of the conductor of an unusual appearance, components mark and a components price can be reduced and surge voltage can be reduced.

[0025] Moreover, since have two power inverter circuits of the above-mentioned configuration, one side was operated as the rectification section, another side was operated as the inverse transformation section and inverter equipment was constituted from this invention, components mark and a components price can be reduced, and surge voltage can be reduced, and electrolytic capacitor capacity can be further made small.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The top view showing the power conversion section (power inverter circuit) concerning the gestalt of operation of this invention.

[Drawing 2] The side elevation showing the power conversion section (power inverter circuit) concerning the gestalt of operation of this invention.

[Drawing 3] The top view showing the principal part of the inverter equipment concerning the gestalt of operation of this invention.

[Drawing 4] The circuit diagram showing the principal part circuit of inverter equipment.

[Drawing 5] The top view showing the conventional principal part of inverter equipment.

[Drawing 6] The top view showing one conventional module.

[Drawing 7] The perspective view showing one conventional module.

[Description of Notations]

1 Rectification Section
2 Inverse Transformation Section
10 Power Conversion Section
20 Inverter Equipment

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21 Rectification Section
22 Inverse Transformation Section
IGBTU, IGBTX, IGBTV, IGBTY, IGBTW, an IGBTZ insulated-gate bipolar mold transistor
DUE, DVE, DWE, DXC, DYC, DZC, DC, DE Conductor
Z1, Z2 Electric insulating plate
C Collector terminal
E Emitter terminal
H Heat sink

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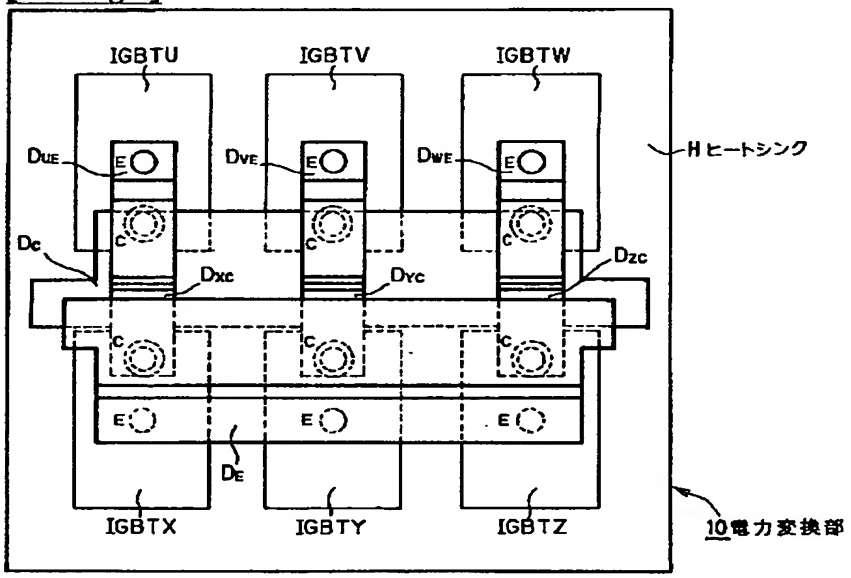
DRAWINGS

[Drawing 1]



[Drawing 2]

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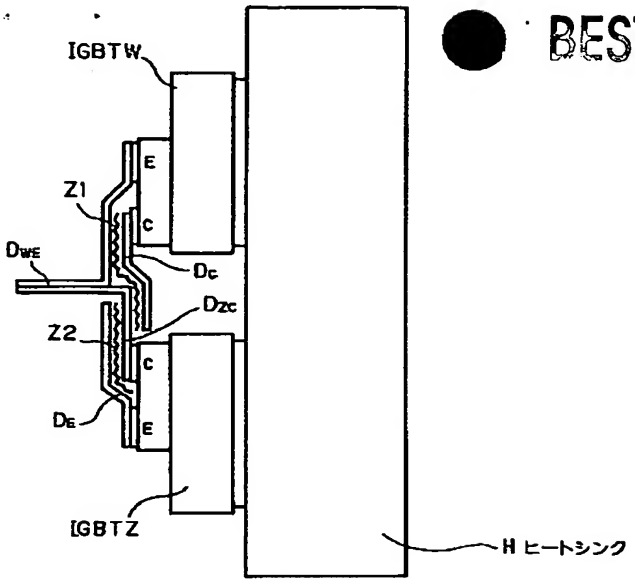
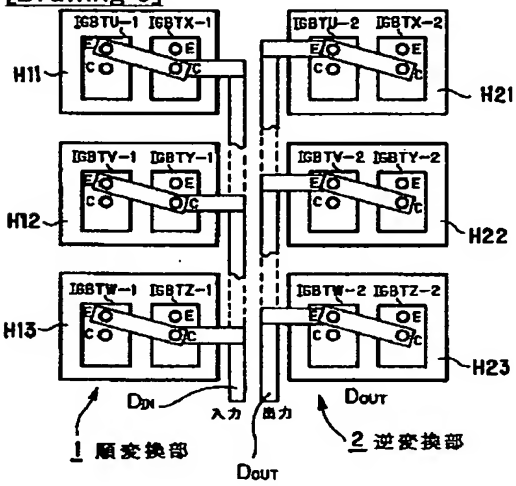
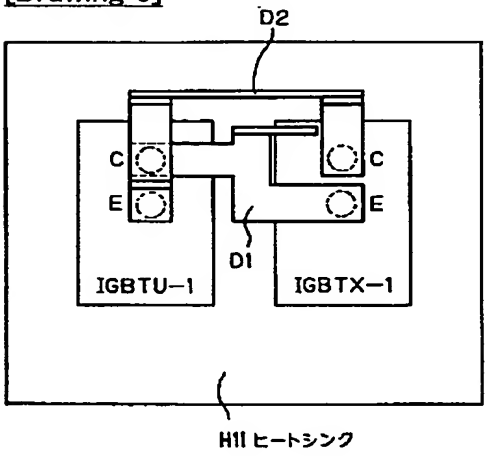


[Drawing 5]



[Drawing 6]



[Drawing 3]

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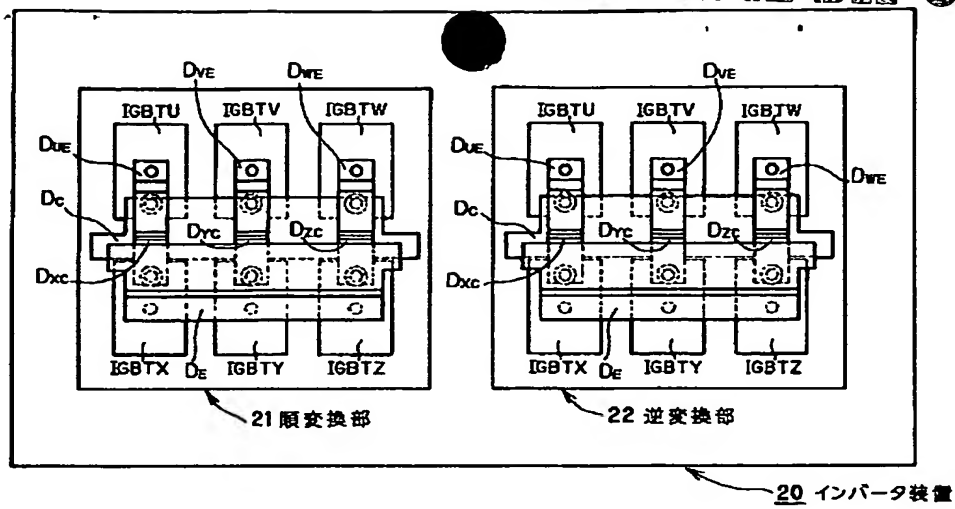
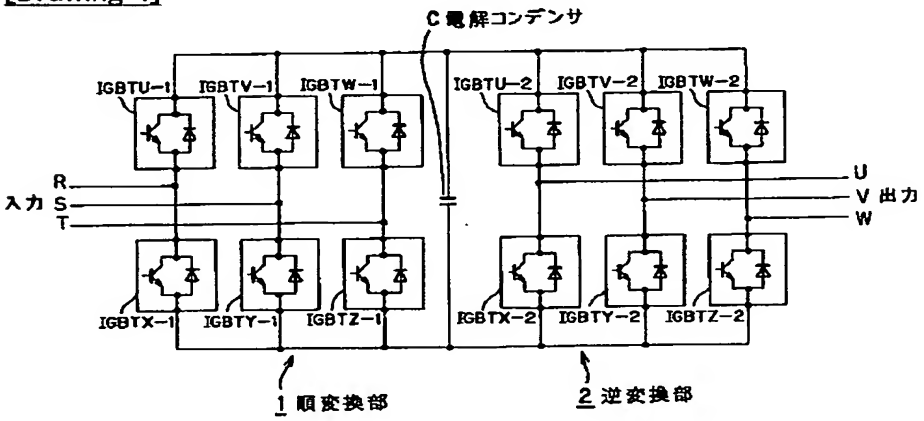
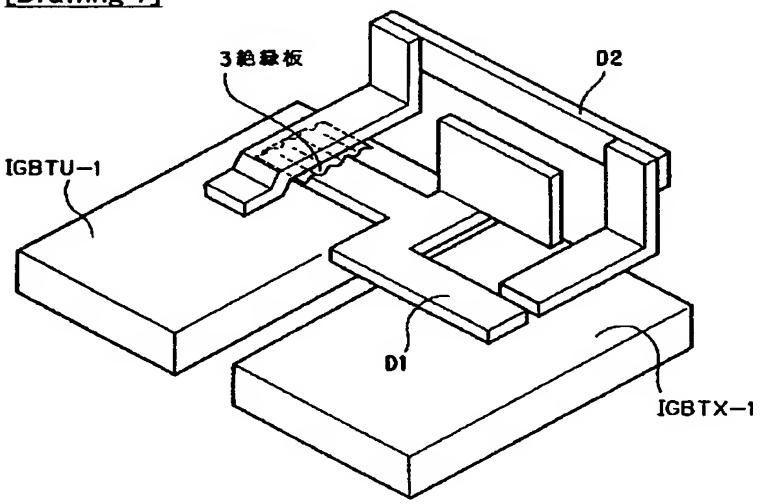


[Drawing 4]



[Drawing 7]



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	7/04		7/04	D

審査請求　未請求　請求項の数２　ＯＬ　（全 5 頁）

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(22)出願日　平成９年(1997)２月４日

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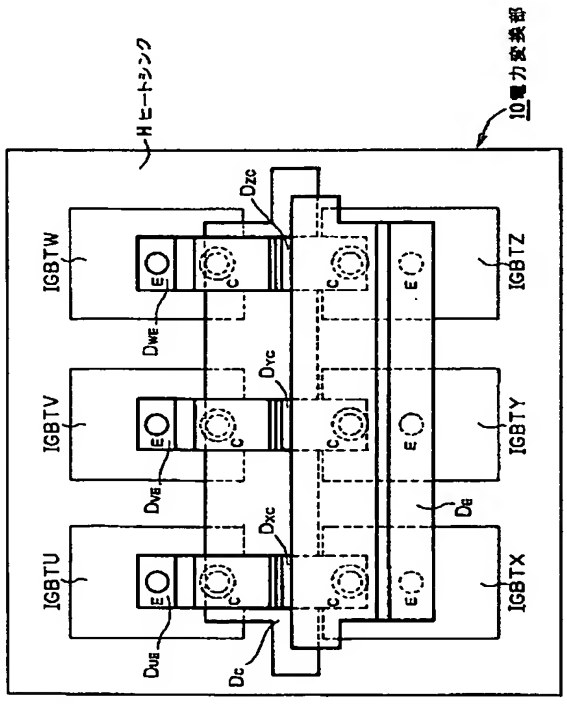
(54)【発明の名称】　電力変換回路及びインバータ装置

(57)【要約】
【課題】　組立工数の低減をはかるとともにサージ電圧を低減する。
【解決手段】　１つのヒートシンクH上に、６個の絶縁ゲートバイポーラ型トランジスタＩＧＢＴＵ，ＩＧＢＴＶ，ＩＧＢＴＷ，ＩＧＢＴＸ，ＩＧＢＴＹ，ＩＧＢＴＺを搭載する。また、三相ブリッジ回路となるように、導体D_{UE}，D_{VE}，D_{WE}，D_{XC}，D_{YC}，D_{ZC}，D_C，D_Eにより接続をする。また異相の導体間に絶縁板を介装して絶縁を確保することにより、前記導体を積層配置する。このようにして構成した電力変換部１０は、インバータ装置の順変換部や逆変換部として採用することができる。



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【特許請求の範囲】

【請求項１】　６個の半導体スイッチング素子を備え、三相ブリッジ回路となるように導体により各半導体スイッチング素子の端子間を接続してなる電力変換回路において、

前記６個の半導体スイッチング素子を１つのヒートシンク上に搭載すると共に、異相の導体間には絶縁物を介装して導体を積層配置して構成したことを特徴とする電力変換回路。

【請求項２】　請求項１の電力変換回路を２個備え、一方を順変換部として機能させ、他方を逆変換部として機能させることを特徴とするインバータ装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、電力変換回路及びインバータ装置に関し、部品点数の削減や組立工数を減少することができるように工夫したものである。

【０００２】

【従来の技術】インバータ装置は、順変換部（順変換回路）及び逆変換部（逆変換回路）を主要部材として構成されている。順変換部及び逆変換部は、半導体スイッチング素子を組み合わせて形成されている。最近では、上記半導体スイッチング素子として、ＩＧＢＴ（insurated gate bipolar trasistor :絶縁ゲートバイポーラ型トランジスタ）が採用されている。

【０００３】ここで、半導体スイッチング素子としてＩＧＢＴを採用したインバータ装置の主回路の回路構成を図４を参照して説明する。同図に示すように、このインバータ装置は、順変換部１と逆変換部２と電解コンデンサＣを主要部材として構成されている。順変換部１は、６個の絶縁ゲートバイポーラ型トランジスタＩＧＢＴＵ－１，ＩＧＢＴＸ－１，ＩＧＢＴＶ－１，ＩＧＢＴＹ－１，ＩＧＢＴＷ－１，ＩＧＢＴＺ－１を三相ブリッジ結線して構成されている。また逆変換部２は、絶縁ゲートバイポーラ型トランジスタＩＧＢＴＵ－２，ＩＧＢＴＸ－２，ＩＧＢＴＶ－２，ＩＧＢＴＹ－２，ＩＧＢＴＷ－２，ＩＧＢＴＺ－２を三相ブリッジ結線して構成されている。

【０００４】順変換部１は、入力端子Ｒ，Ｓ，Ｔから入力される商用周波数の三相交流電力を直流電力に変換し、逆変換部２は、順変換部１により直流電力に変換された直流電力を、所望周波数の三相交流電力に変換して出力端子Ｕ，Ｖ，Ｗから出力する。

【０００５】次に、半導体スイッチング素子としてＩＧＢＴを採用した従来のインバータ装置の機械的構成を、図５を参照して説明する。同図に示すように、順変換部１では、ヒートシンクＨ１１上に２つの絶縁ゲートバイポーラ型トランジスタＩＧＢＴＵ－１，ＩＧＢＴＸ－１を搭載し、ヒートシンクＨ１２上に２つの絶縁ゲートバイポーラ型トランジスタＩＧＢＴＶ－１，ＩＧＢＴＹ－１を搭載し、ヒートシンクＨ１３上に２つの絶縁ゲートバイポーラ型トランジスタＩＧＢＴＷ－１，ＩＧＢＴＺ－１を搭載している。また、逆変換部２では、ヒートシンクＨ２１上に２つの絶縁ゲートバイポーラ型トランジスタＩＧＢＴＵ－２，ＩＧＢＴＸ－２を搭載し、ヒートシンクＨ２２上に２つの絶縁ゲートバイポーラ型トランジスタＩＧＢＴＶ－２，ＩＧＢＴＹ－２を搭載し、ヒートシンクＨ２３上に２つの絶縁ゲートバイポーラ型トランジスタＩＧＢＴＷ－２，ＩＧＢＴＺ－２を搭載している。なお、図５では、入力用の導体D_{IN}と出力用の導体D_{OUT}のみを示し、他の導体は図示省略している。

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【０００６】本明細書では、ヒートシンク１個当りの組み合わせを「モジュール」と称する。ここで、図６及び図７を基に、従来のインバータ装置の１モジュールについて、詳細に説明する。両図に示すように、ヒートシンクＨ１１上には２つの絶縁ゲートバイポーラ型トランジスタＩＧＢＴＵ－１，ＩＧＢＴＸ－１が搭載されている。そして、ＩＧＢＴＵ－１のコレクタ端子Ｃと、ＩＧＢＴＸ－１のエミッタ端子Ｅは導体Ｄ１により接続されている。また、ＩＧＢＴＵ－１のエミッタ端子ＥとＩＧＢＴＸ－１のコレクタ端子Ｃは導体Ｄ２により接続されている。更に、導体Ｄ１と導体Ｄ２との間には、絶縁板３を介在させて、導体Ｄ１，Ｄ２間の絶縁を確保している。

【０００７】他のモジュール（順変換部１の各モジュール及び逆変換部２の各モジュール）についても、図６，図７と同様な構成となっている。

【０００８】

【発明が解決しようとする課題】ところで、上記従来のインバータ装置では、順変換部１に３個のモジュール、逆変換部２に３個のモジュール、即ち、合計で６個のモジュールが必要である。このため、ヒートシンク等の部品価格が増大すると共に、組立工数が増大するという問題がある。

【０００９】また、順変換部１および逆変換部２が、それぞれ３モジュールに分割されているため、モジュール間の距離が長くなり、サージ電圧が高くなるという問題もあった。

【００１０】本発明は、上記従来技術に鑑み、組立が簡単で且つ電気的特性の良好な電力変換回路及びインバータ装置を提供することを目的とする。

【００１１】

【課題を解決するための手段】上記課題を解決する本発明にかかる電力変換回路の構成は、６個の半導体スイッチング素子を備え、三相ブリッジ回路となるように導体により各半導体スイッチング素子の端子間を接続してなる電力変換回路において、前記６個の半導体スイッチング素子を１つのヒートシンク上に搭載すると共に、異相の導体間には絶縁物を介装して導体を積層配置したことを特徴とする。

【００１２】また本発明に係るインバータ装置の構成は、上記構成の電力変換回路を２個備え、一方を順変換部として機能させ、他方を逆変換部として機能させることを特徴とする。

【００１３】

【発明の実施の形態】以下に、本発明の実施の形態を図面に基づき詳細に説明する。

【００１４】図１は本発明の実施の形態にかかる電力変換部（電力変換回路）１０を示す平面図、図２はその側面図である。この電力変換部１０は、後述するように、インバータ装置の順変換部や逆変換部に適用することができる。

【００１５】図１及び図２に示すように、本実施の形態にかかる電力変換部１０では、１個のヒートシンクHの上に、６個の絶縁ゲートバイポーラ型トランジスタＩＧＢＴＵ，ＩＧＢＴＸ，ＩＧＢＴＶ，ＩＧＢＴＹ，ＩＧＢＴＷ，ＩＧＢＴＺが搭載されている。またこれらＩＧＢＴＵ，ＩＧＢＴＸ，ＩＧＢＴＶ，ＩＧＢＴＹ，ＩＧＢＴＷ，ＩＧＢＴＺには、それぞれコレクタ端子Ｃとエミッタ端子Ｅとベース端子（図示省略）が備えられている。

【００１６】そしてＩＧＢＴＵ，ＩＧＢＴＶ，ＩＧＢＴＷのエミッタ端子Ｅには、それぞれ導体D_{UE}，D_{VE}，D_{WE}が接続されている。またＩＧＢＴＸ，ＩＧＢＴＹ，ＩＧＢＴＺのコレクタ端子Ｃには、それぞれ導体D_{XC}，D_{YC}，D_{ZC}が接続されている。そして、導体D_{UE}と導体D_{XC}とが接続され、導体D_{VE}と導体D_{YC}とが接続され、導体D_{WE}と導体D_{ZC}とが接続されている。かくてＩＧＢＴＵ，ＩＧＢＴＶ，ＩＧＢＴＷのエミッタ端子Ｅと、ＩＧＢＴＸ，ＩＧＢＴＹ，ＩＧＢＴＺのＲ　コレクタ端子Ｃとが個別に接続されている。

【００１７】またＩＧＢＴＵ，ＩＧＢＴＶ，ＩＧＢＴＷのコレクタ端子Ｃは、導体D_Cに接続されて、このコレクタ端子Ｃ相互が接続されている。またＩＧＢＴＸ，ＩＧＢＴＹ，ＩＧＢＴＺのエミッタ端子Ｅは導体D_Eに接続されて、このエミッタ端子Ｅ相互が接続されている。

【００１８】上述したように、導体D_{UE}，D_{VE}，D_{WE}、導体D_{XC}，D_{YC}，D_{ZC}、導体D_C、導体D_Eにより接続をすることにより、三相ブリッジ回路が構成されている。

【００１９】しかも、異相である導体D_{UE}，D_{VE}，D_{WE}と導体D_Cとの間には、絶縁板Ｚ１を介装し、異相である導体D_{XC}，D_{YC}，D_{ZC}と導体D_Eとの間には、絶縁板Ｚ２を介装している。このようにして絶縁を確保しているため、板状の導体D_{UE}，D_{VE}，D_{WE}、導体D_{XC}，D_{YC}，D_{ZC}、導体D_C、導体D_Eを積層配置して構成することができる。

【００２０】このように１つの電力変換部１０を１モジュールとすることができるので、部品点数の削減および部品価格の低減ができるとともに、組立工数が減少する。更に、異相の導体間は絶縁板を介して配置されるため、サージ電圧の抑制を図ることができる。

【００２１】図３は本発明の実施の形態にかかるインバータ装置２０を示す。このインバータ装置２０では、順変換部２１及び逆変換部２２を備えている。順変換部２１及び逆変換部２２は、図１に示す電力変換部１０と同様な構成となっており、順変換部２１で１モジュール、逆変換部２２で１モジュールとなっており、インバータ装置２０の全体として２モジュールの電力変換部を用いる構成となっている。なお、図２では、入出力用の導体及び電解コンデンサは図示省略している。

【００２２】図３のインバータ装置２０では、２つの電力変換部すなわち２モジュールで構成することができるので、部品点数，部品価格及び組立工数を削減することができる。また、モジュール間距離、即ち、順変換部２１と逆変換部２２との距離を短くできるので、サージ電圧を低減できるとともに、電解コンデンサの容量を小さくすることができる。更に、異相の導体間は絶縁板を介して配置されるため、サージ電圧の抑制を図ることができる。

【００２３】なお上記実施の形態では、半導体スイッチング素子として絶縁ゲートバイポーラ型トランジスタを用いた例を示したが、他の半導体スイッチング素子を用いた電力変換回路（電力変換部）やインバータ装置にも、本発明を適用することができることはいうまでもない。

【００２４】

【発明の効果】以上実施の形態と共に具体的に説明したように、本発明では、６個の半導体スイッチング素子を備え、三相ブリッジ回路となるように導体により各半導体スイッチング素子の端子間を接続してなる電力変換回路において、前記６個の半導体スイッチング素子を１つのヒートシンク上に搭載すると共に、異相の導体間には絶縁物を介装して異相の導体を積層配置する構成としたので、部品点数，部品価格を低減でき、また、サージ電圧を低減することができる。

【００２５】また本発明では、上記構成の電力変換回路を２個備え、一方を順変換部として機能させ、他方を逆変換部として機能させてインバータ装置を構成したため、部品点数，部品価格を低減でき、また、サージ電圧を低減することができ、さらに電解コンデンサ容量を小さくすることができる。

【図面の簡単な説明】

【図１】本発明の実施の形態にかかる電力変換部（電力変換回路）を示す平面図。

【図２】本発明の実施の形態にかかる電力変換部（電力変換回路）を示す側面図。

【図３】本発明の実施の形態にかかるインバータ装置の主要部を示す平面図。

【図４】インバータ装置の主要部回路を示す回路図。

【図５】インバータ装置の従来の主要部を示す平面図。

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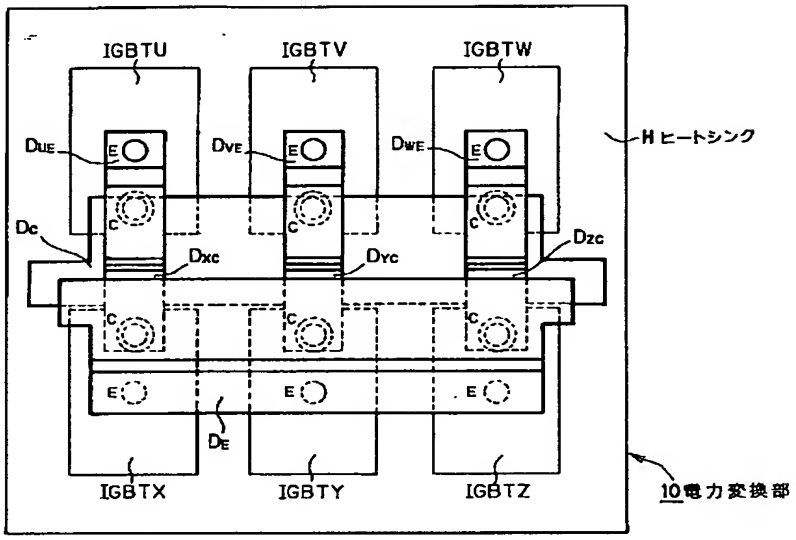
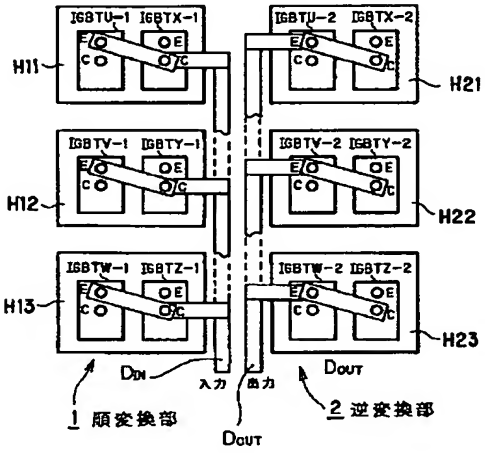
【図６】従来の１モジュールを示す平面図。
【図７】従来の１モジュールを示す斜視図。
【符号の説明】
１　順変換部
２　逆変換部
１０　電力変換部
２０　インバータ装置
２１　順変換部
２２　逆変換部
＊ＩＧＢＴＵ，ＩＧＢＴＸ，ＩＧＢＴＶ，ＩＧＢＴＹ，ＩＧＢＴＷ，ＩＧＢＴＺ絶縁ゲートバイポーラ型トランジスタ
D_{UE}，D_{VE}，D_{WE}，D_{XC}，D_{YC}，D_{ZC}，D_C，D_E　導体
Ｚ１，Ｚ２　絶縁板
Ｃ　コレクタ端子
Ｅ　エミッタ端子
＊　Ｈ　ヒートシンク

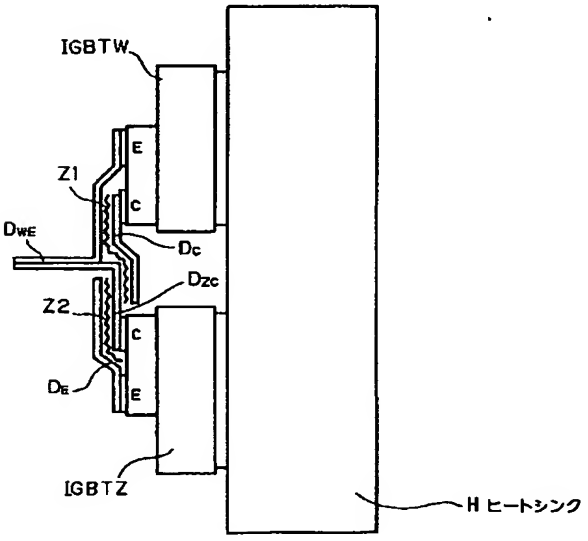
【図１】



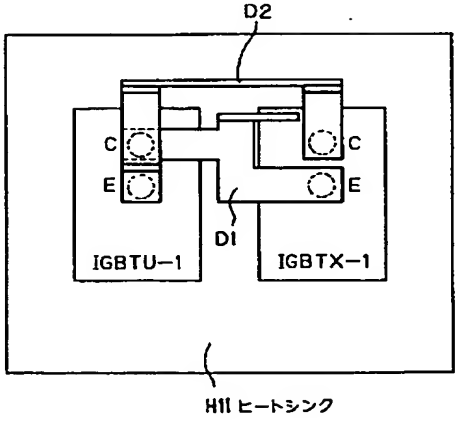
【図５】



【図２】



【図６】



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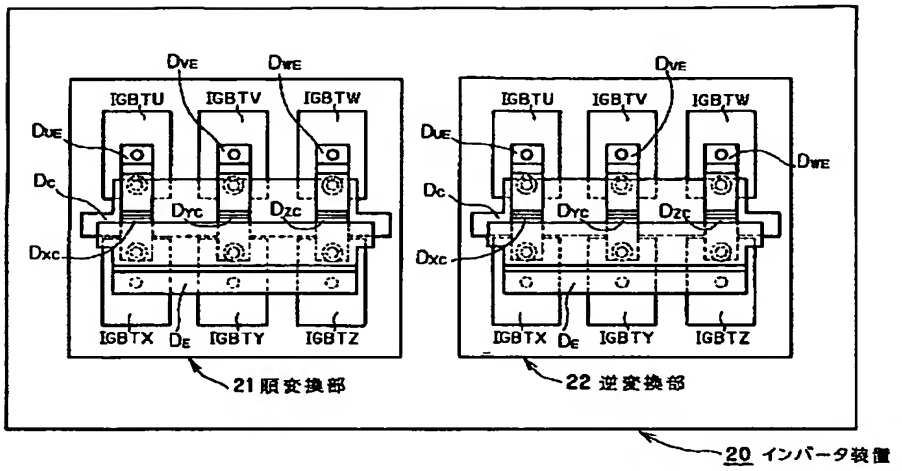
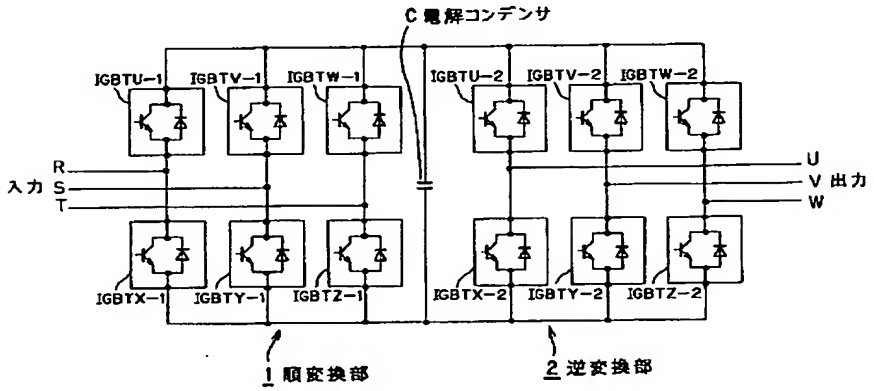
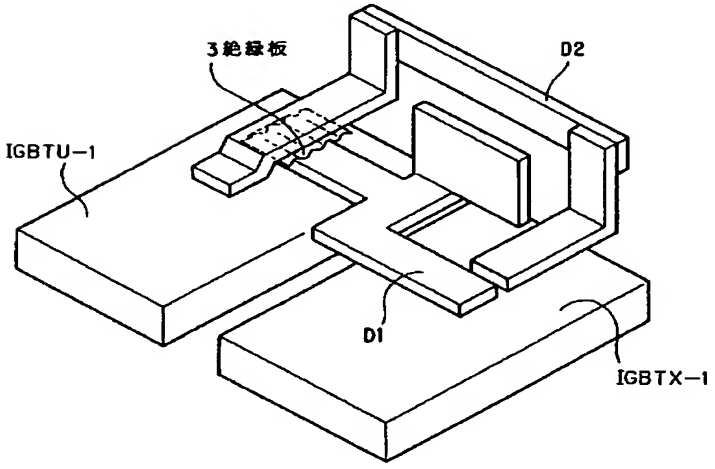
【図3】



【図4】



【図7】



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